

REMARKS

This application has been reviewed in light of the Office Action dated June 24, 2004. In view of the foregoing amendments and the following remarks, favorable reconsideration and withdrawal of the rejections set forth in the Office Action are respectfully requested.

Claims 73-85 are pending. Claim 76 has been cancelled herein without prejudice or disclaimer of subject matter. Claims 73, 83 and 84 have been amended. Support for the claim changes can be found in the original disclosure, for example at page 10, lines 17-22 of the specification. Therefore, no new matter has been added. Claims 73, 83 and 84 are in independent form.

Applicants note that the Examiner indicated in Paragraph 3 of the Office Action and on the Notice of References Cited that the English translation of the Korean Office Action, which was submitted with the Fifth Information Disclosure Statement filed on April 20, 2004, has been considered. Since the Fifth Information Disclosure Statement did not cite any other documents, Applicants understand that the Examiner's contention that that Information Disclosure Statement fails to comply with 37 C.F.R. § 1.98(a)(1) is inapplicable.

Claims 73, 74, 76-81 and 83-85 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,500,988 (*Moynihan et al.*) in view of U.S. Patent No. 5,719,417 (*Roeder et al.*). Claim 75 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over *Moynihan et al.* in view of *Roeder et al.* and further in view of European Patent Publication EP 0 930 165 (*EP '165*). Claim 82 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over *Moynihan et al.* in view of *Roeder et al.* and further in view

of U.S. Patent No. 5,453,262 (*Dawson et al.*). In view of the cancellation of Claim 76, the rejection of that claim is moot. In response to the rejections of the other claims, Applicants submit the following remarks.

Independent Claim 73 is directed to a method for manufacturing a piezoelectric element structure having a supporting substrate and a piezoelectric single crystal film or a piezoelectric single orientational crystal film supported on the supporting substrate.

Moynihan et al. relates to a method of making a perovskite thin-film ink jet transducer. According to *Moynihan et al.*, PZT layers are applied to a substrate by a sol gel process and then annealed by heating to 600°C to 800°C. In *Moynihan et al.* a piezoelectric, polycrystalline film is formed (see, e.g., col. 6, line 57). Nothing in *Moynihan et al.* is seen to teach or suggest formation of a piezoelectric single crystal film or a piezoelectric single orientational crystal film, by such a method as recited in Claim 73.

Roeder et al. relates to a ferroelectric integrated circuit structure and method of fabricating the same. According to *Roeder et al.*, a seed layer 37 and a ferroelectric layer 40 may be formed by a vapor deposition method at 525°C to 550°C (see, e.g., col. 7, lines 12-36). However, Applicants can find nothing in *Roeder et al.* that would teach or suggest formation of a piezoelectric single crystal film or a piezoelectric single orientational crystal film, by such a method as recited in Claim 73. Specifically, *Roeder et al.* (Figs. 6 and 7) shows that a polar vector exists in a direction [001] for a tetragonal crystalline lattice structure and [111] for a rhombohedral crystalline lattice structure. According to *Roeder et al.*, the crystal structure is made in accordance with the element ratio of A-sites and B-sites. For example, the X-ray diffraction (θ -2 θ) of Figs. 8-10 shows high magnitudes of [100] and [111] peaks. However,

the material used is PZT and the PZT is a polycrystalline film, as shown in Figs. 10 and 11. The presence of multiple peaks is understood to indicate that the material is not a mono-crystal or mono-orientational crystal.

Since neither *Moynihan et al.* nor *Roeder et al.*, whether taken singly or in combination (even assuming, for the sake of argument, that such combination were permissible), contains all of the elements of independent Claim 73, that claim is believed allowable over those documents. Since independent Claims 83 and 84 recite features identical or similar to the above-noted feature of Claim 73, Claims 83 and 84 are believed allowable for at least the same reasons.


A review of the other art of record, including *EP '165* and *Dawson et al.*, has failed to reveal anything which, in Applicants' opinion, would remedy the deficiencies of the art discussed above, as references against the independent claims herein. Those claims are therefore believed patentable over the art of record.

The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for at least the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicants respectfully request favorable reconsideration and early passage to issue of the present application.

Applicants' undersigned attorney may be reached in our Washington, D.C. Office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,



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